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(71) Applicant(s)
Hewlett-Packard Company
(Incorporated in USA - Delaware)
3000 Hanover Street, Palo Alto, California 94304,
United States of America

(72) Inventor(s)
Charles E Cantwell

(74) Agent and/or Address for Service
Carpmaels & Ransford
43 Bloomsbury Square, LONDON, WC1A 2RA,
United Kingdom

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(54) Abstract Title
Configuring a client for a printer using electronic mail

(57) A printer driver is installed on a client computer (4). The client (4) requests the driver (22) from a print server (10). The print server (10) identifies a printer (12) served by the print server (10). The print server (10) retrieves a driver (22) for the printer (12) and a description (24) of the printer's capabilities. The driver (22) and the description (24) are packaged into an electronic mail (e-mail) message and sent to the client (4). Software (6) installed on the client (4) unpackages the driver and the description from the e-mail and installs the driver on the client (4). The software also creates a port on the client (4) and attaches the port to the printer driver.

FIG. 1

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FIG. 1

PRINTER MANUFACTURER'S SERVER 〜26

E-MAIL SERVER 〜14

CLIENT 6

CLIENT SOFTWARE

PORT MONITOR 〜8

4

11

DRIVER SERVER

DRIVER 〜22

DESCRIPTION OF CAPABILITIES 〜24

18

PRINT SERVER 〜10

PASS LIST SERVER 〜16

PASS LIST 〜20

PRINTER 〜12

2

REQUEST DRIVER — 28

SEND E-MAIL — 30

IDENTIFY SENDER — 32

ALLOWED USER ? — 34

NEGATIVE REPLY TO SENDER — 36

YES

NO

IDENTIFY PRINTER — 38

RETRIEVE DRIVER AND CAPABILITIES — 40

PACKAGE INTO E-MAIL — 42

SEND E-MAIL — 44

RECEIVE E-MAIL — 46

UNPACKAGE DRIVER AND CAPABILITIES — 48

INSTALL DRIVER — 50
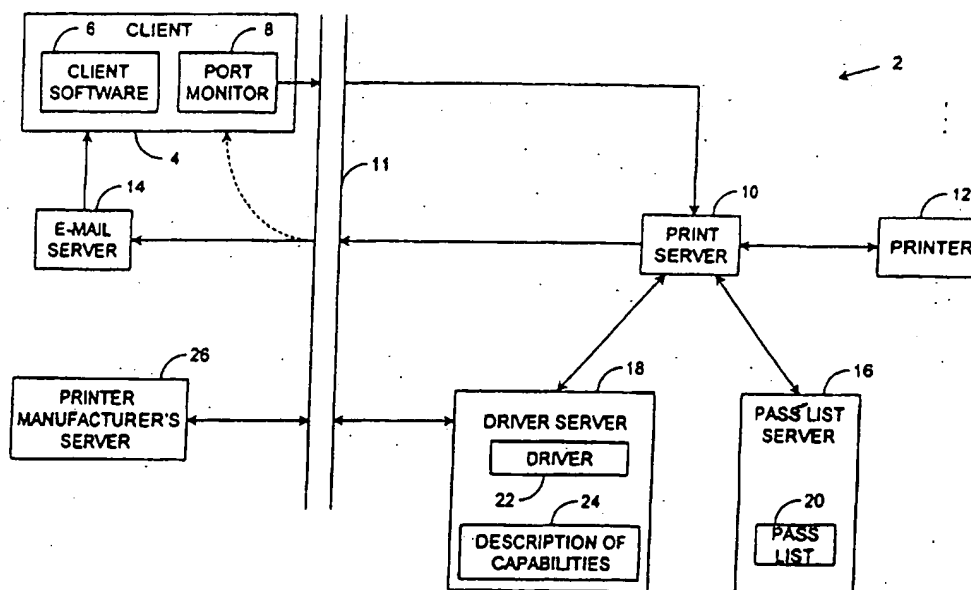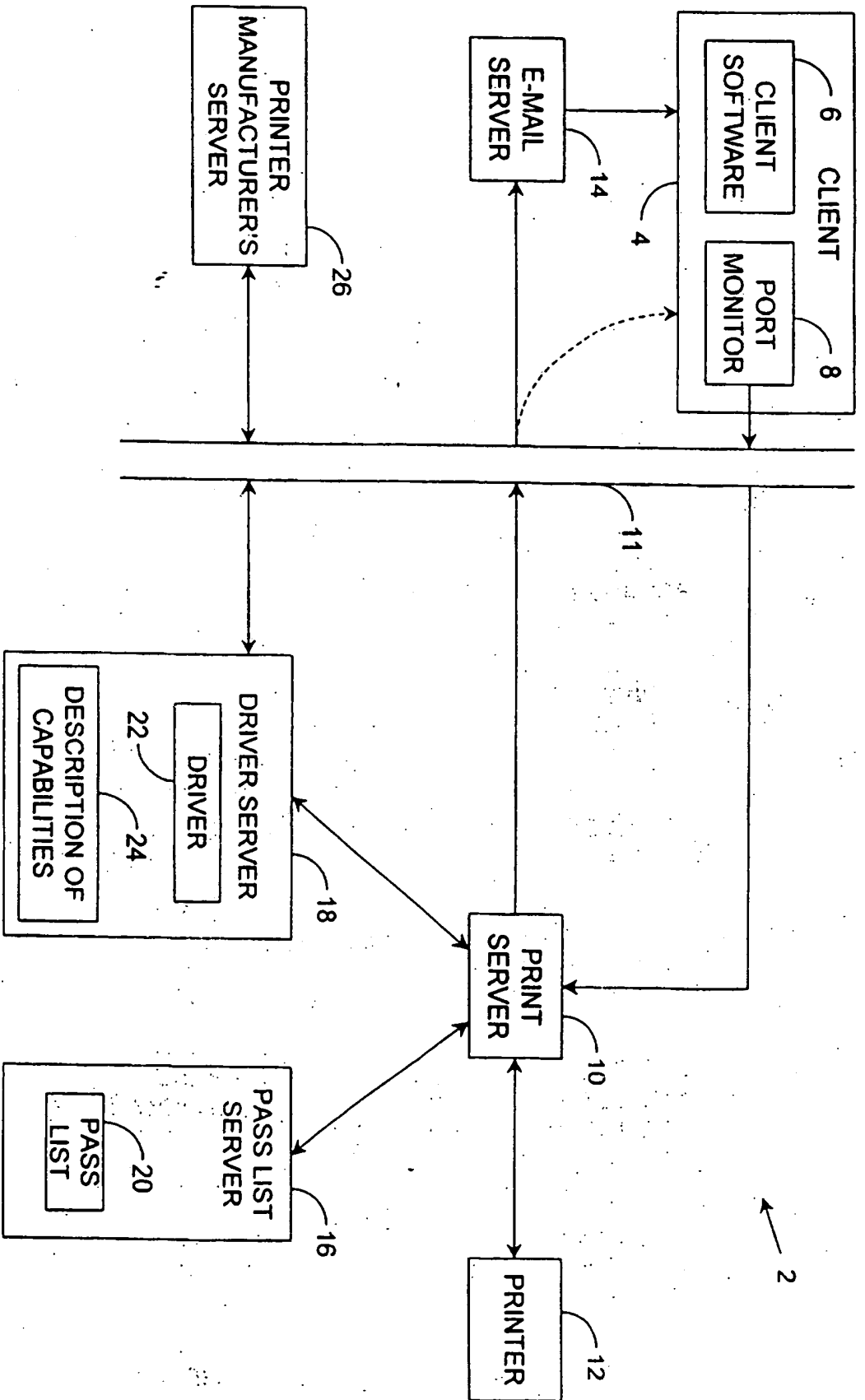
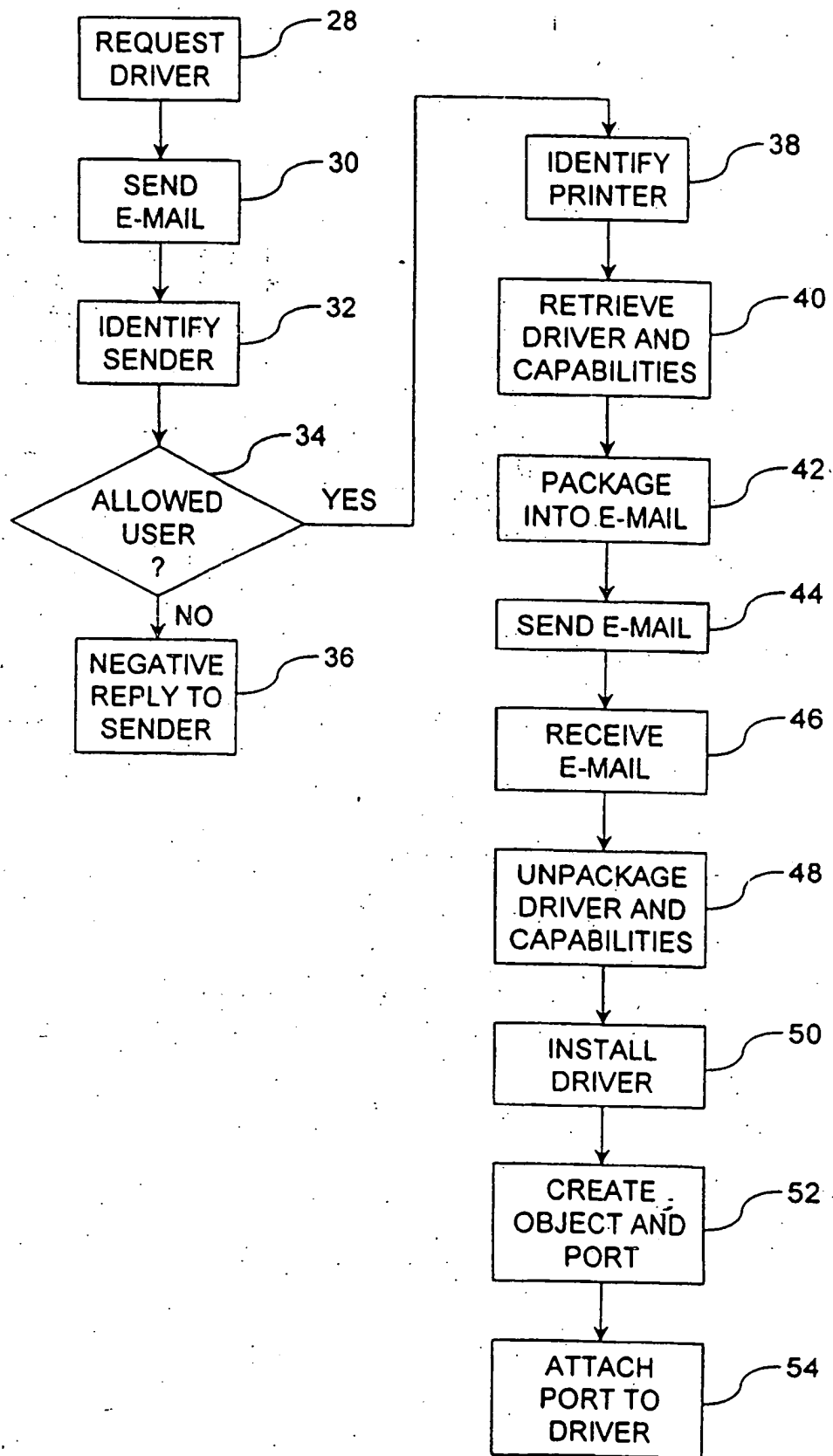CREATE OBJECT AND PORT — 52

ATTACH PORT TO DRIVER — 54

FIG. 2

CONFIGURING A CLIENT FOR A PRINTER USING ELECTRONIC MAIL

FIELD OF THE INVENTION

This invention relates in general to configuring a print client for a printer and,
5   more particularly, to a system and method for configuring the client using electronic
mail messages.

BACKGROUND OF THE INVENTION

It is often desirable for a print client to send a print job to a printer using the
10   Internet as a path for sending the print job. However, conventional printing methods
using the internet fail when trying to pass through a firewall. A firewall does not
allow print jobs to pass through.

One method used by the prior art to print through a firewall is to attach the
print job to an electronic mail (e-mail) message. The e-mail message and the
15   attached print job are then sent through the firewall. The print job is then detached
from the e-mail message and printed.

One problem with using the e-mail method is that the print client often does
not know anything about the printer to which the job will be sent. In addition, the
client has no means of readily discovering information about the printer. Thus, the
20   client cannot easily determine the capabilities of the printer or which driver should be
used for the printer. Additionally, even if the client could determine the appropriate
driver, the client may be in a remote location without access to the correct driver for
the printer.

25   ## SUMMARY OF THE INVENTION

According to principles of the present invention, a printer driver is installed on
a client computer. The client requests the driver from a print server. The print
server identifies a printer served by the print server. The print server retrieves a
driver for the printer and a description of the printer's capabilities. The driver and the

description are packaged into an electronic mail (e-mail) message and sent to the client. Software installed on the client unpackages the driver and the description from the e-mail and installs the driver on the client. The software also creates a port on the client and attaches the port to the printer driver.

5   According to further principles of the present invention, the print server determines a user of the client and compares the user to a list of allowed users. If one of the users on the list of allowed users matches the user of the client, the print server provides the print driver to the client. If there is no match, the print server does not provide the driver to the client.

10   A printer may be setup on the client machine by simply entering the destination e-mail address of the printer in the client software. A series of e-mail messages are traded between the print client software and the print server, which automatically sets up the printer on the client machine. At no point does the user need to know anything about the printer except its e-mail address.

15   Other objects, advantages, and capabilities of the present invention will become more apparent as the description proceeds.

DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram illustrating components of the present invention.

20   Figure 2 is a flow chart illustrating one method for installing a print driver on a client.

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 illustrates a system 2 for using the electronic mail (e-mail) to

25 transport a print driver to a client 4. Client 4 is a computer or other device that uses printers for print jobs. Client software 6 is installed on client 4. Client software 6 is responsible for printer configuration, printer setup, and print utilities. Port monitor 8 is also installed on client 6. Port monitor 8 intercepts print jobs from client 6 and

packages them in an electronic mail (e-mail) message then sends them to a print server 10. Print server 10 may be separated from client 4 by firewall 11. Although the present invention solves some of the difficulties created by firewall 11, print server 10 and client 4 need not be separated by firewall 11 to practice the present

5   invention. System 2 may be connected by an intranet or an internet.

Print server 10 is either embedded in printer 12 or a computer that communicates with printer 12. Print server 10 is the main junction for system 2. Besides port monitor 8 and printer 12, print server 10 also communicates with a pass list server 16 and a driver server 18.

10   Print server 10 communicates with port monitor 8 by exchanging e-mail messages. If necessary or desirable, e-mail messages sent to port monitor 8 first pass through an e-mail server 14. From e-mail server 14, the e-mail messages are passed to client 6 and then to port monitor 8.

Pass list server 16 contains a pass list 20 of individuals or groups of

15   individuals that are authorized to use printer 12. The individuals and groups authorized to use printer 12 will be referred to as the allowed users. If print server 10 has the capabilities to do so, pass list 20 may be stored on print server 10. Alternatively, pass list server 16 is a computer that communicates with print server 10. Optionally, pass list server 4 also includes software for tracking print jobs, load

20   balancing, billing, resource ordering, and other desirable functions.

Driver server 18 is responsible for maintaining printer drivers 22 for printer 12. Drivers 22 are necessary for client 6 to format its print jobs properly for printer 12. Driver server 18 maintains a mapping between the printer model name and the appropriate driver 22 for the appropriate client operating systems. Driver server 18

25   may also contain default drivers for unknown printers.

A driver server auto-update mechanism 24 is responsible for communicating with a printer manufacturer's server 26 which contains the latest drivers for printer 12. Mechanism 24 updates driver server 18 automatically with the latest drivers

available from the manufacturer. Optionally, mechanism 24 may also receive e-mail notifications from the printer manufacturer that allow mechanism 24 to retrieve the latest drivers.

5   Figure 2 illustrates how the system components act together to install a driver 22 on client 4 using e-mail. First, a driver is requested. The driver may be requested by the client or someone else on the client's behalf. Alternatively, the request step may be omitted, such as in the case of an automatic driver installation to a known user.

10   In one embodiment, the driver is requested by a user of client 4 running client software 6 and selecting "Printer Installation". The user is then prompted for an e-mail address of printer 12. Client software 6 then sends 30 an e-mail to the print server 10 asking it for a description of the capabilities of printer 10 and a driver file 22. The e-mail contains information about the operating system and preferences of

15   client 4. Optionally, the e-mail is encrypted and digitally signed.

      Print server 10 identifies 32 the sender of the e-mail, checks the digital signature and decrypts the e-mail. The sender is checked 34 against a pass list 20 either on the print server 10 or against a list 20 on the pass-list server 16. If the sender is not an allowed user, the e-mail is discarded. Optionally, print server 10

20   sends 36 a negation reply e-mail to the user. Comparing the sender of the request e-mail to a pass list is an optional step and may be bypassed in systems where such security measures are unnecessary or undesirable.

      If the sender is an allowed user, the print server 10 identifies 38 the printer 12 attached to it. The identity of the printer 12 may be hard-coded for some print

25   servers. Print server 10 then retrieves 40 the proper printer driver 22 from the driver server 18. This driver 22 and the description of the capabilities of the printer 12 are packaged 42 into an e-mail and sent 44 back to client 4.

      Client software 6 receives 46 the e-mail and unpackages 48 driver 22 and the

description from the e-mail. Client software 6 then installs 50 driver 22 on client 4. Next, client software 6 creates 52 a printer object and a print port on client 4 and attaches 54 the print port to driver 22. Client 6 is then ready to print to printer 12.

Driver auto-update mechanism 24 runs in the background on driver server

5   18. Mechanism 24 communicates with printer manufacturer's server 26 directly and retrieves driver updates and new drivers. The communications with the printer manufacturer takes place with e-mail. Auto-update mechanism 24 may be configured to poll manufacturer's server 26 or register itself with the manufacturer to receive e-mail updates automatically. When auto-update mechanism 24 receives a

10   new driver 22, it sets it up in either a database or a known directory structure format. If it is a new driver, an entry is made in its internal mapping list that correlates printer models to the drivers.

Before beginning the steps illustrated in Figure 2, print server 10 should exist either as software on a computer that communicates to a printer 12, or embedded

15   into printer 12 directly; port monitor 8 and client software 6 should already be installed on client 4; and if desired, pass list server 16 and driver server 18 should already be setup and configured.

Since system 2 identifies printer 12 and sends the correct driver 22 to the user, the user does not need to know which driver 22 is required for printer 12, or

20   even the make and model of printer 12. Also, since client software 6 installs driver 22, the user does not need to setup the printer driver manually.

Additionally, the user does not need to know who administers printer 12. Administrators can create pass lists 20 of allowed users to avoid unauthorized use of printer 12. Administrators may also optionally setup additional software on the pass-

25   list server to do billing, load balancing, resource ordering, and other tasks.

It should be understood that the foregoing description is only illustrative of the invention. Various alternatives and modifications can be devised by those skilled in the art without departing from the invention. Accordingly, the present invention is

intended to embrace all such alternatives, modifications and variances that fall within the scope of the appended claims.

CLAIMS

What is claimed is:

1   1.   A method for installing (50) a printer driver (22) on a client (4), the
2 method comprising:
3   (a)   requesting (28) a printer driver (22);
4   (b)   the print server (10) identifying (38) a printer (12) served by the
5 print server (10);
6   (c)   retrieving (40) the printer driver (22) for the printer (12);
7   (d)   packaging (42) the printer driver (22) into a reply electronic mail
8 message;
9   (e)   sending (44) the reply electronic mail message to the client (4);
10   (f)   unpackaging (48) the driver (22) from the reply electronic mail
11 message; and,
12   (g)   installing (50) the driver (22) on the client (4).

1   2.   The method of claim 1 wherein requesting (28) the print driver (22)
2 includes:
3   (a)   packaging a request into a request electronic mail message;
4   (b)   sending the request electronic mail message to the print server
5 (10);
6   (c)   the print server (10) receiving the request electronic mail
7 message; and,
8   (d)   the print server (10) unpackaging the request from the request
9 electronic mail message.

1   3.   The method of claim 1 further including:

2   (a)   creating (52) a print port on the client (4); and,

3   (b)   attaching (54) the print port to the printer driver (22).

1   4.   The method of claim 1 further including:

2   (a)   identifying (32) a user of the client (4); and,

3   (b)   comparing (34) the user to a list (20) of allowed users.

1   5.   The method of claim 1 further including:

2   (a)   retrieving (40) a description (22) of the capabilities of the printer

3 (12);

4   (b)   packaging (42) the description (22) into the reply electronic

5 mail message; and,

6   (c)   unpackaging (48) the description (22) from the reply electronic

7 mail message.

1   6.   A system for installing (50) a printer driver (22) on a client (4), the

2 system comprising:

3   a)   means for requesting a printer driver (22);

4   (b)   a print server (10) having means for identifying a printer (12)

5 served by the print server (10);

6   (c)   means for retrieving the printer driver (22) for the printer (12);

7   (d)   means for packaging the printer driver (22) into a reply

8 electronic mail message;

9   (e)   means for sending the reply electronic mail message to the

10 client (4);

11   (f)   means for unpackaging the driver (22) from the reply electronic

12 mail message; and,

13   (g)   means for installing (50) the driver (22) on the client (4).

1   7.   The system of claim 6 wherein the means for requesting the print

2 driver (22) includes:

3   (a)   means for packaging a request into a request electronic mail

4 message;

5   (b)   means for sending the request electronic mail message to the

6 print server (10);

7   (c)   the print server (10) having means for receiving the request

8 electronic mail message; and,

9   (d)   the print server (10) having means for unpackaging the request

10 from the request electronic mail message.

1   8.   The system of claim 6 further including:

2   (a)   means for creating a print port on the client (4); and,

3   (b)   means for attaching the print port to the printer driver (22).

1   9.   The system of claim 6 further including:

2   (a)   means for identifying a user of the client (4); and,

3   (b)   means for comparing the user to a list of allowed users.

1   10.   The system of claim 6 further including:

2   (a)   means for retrieving a description (22) of the capabilities of the

3 printer (12);

4   (b)   means for packaging the description (22) into the reply

5 electronic mail message; and,

6   (c)   means for unpackaging the description (22) from the reply

7 electronic mail message.

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INVESTOR IN PEOPLE

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Claims searched: 1-10   Date of search: 19 October 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

    UK Cl (Ed.R): G4A (AFL), G4H (HGN)

    Int Cl (Ed.7): G06F

Other: Online: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
	None	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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